

**REMARKS**

**I. Status of the Claims**

Claims 30-179 are pending in this application. Of these claims, 56-149 and 173-179 have been withdrawn from consideration based on Applicant's election with traverse.

The Examiner, in the March 4, 2005 Office Action, rejected several claims and indicated that several claims are allowable over the prior art. The Applicant appreciates the Examiner's indication of allowable subject matter and, in response, has cancelled certain claims and amended others to place these claims in condition for allowance.

In this Amendment, Applicant has cancelled claims 30-33, has amended claims 34, 39, 50-55, 150-154, 156-158, 167-169, and 171, and has added new claims 180 - 194. Written description support for the new and presently amended claims may be found throughout the specification and claims. The amended claims thus do not introduce new subject matter. For example, support for amended claims 34, 51, 55, 150, and 172 and new claims 180-181, and 183-194 may be found in the specification at page 23, line 19 – page 24, line 6, discussing the use of sulfur media to support bacteria. Further, support for new claim 182 may be found in the specification at page 15, lines 11-12. Additionally, amended claim 52 now includes a proper antecedent basis. For the reasons explained below, Applicant respectfully submits that the application, as amended, is in condition for allowance.

## **II. Claim Objections**

The Examiner objected to claims 50-51, 53-54, 153-163, and 167-171 as being dependent upon a rejected base claim but indicated the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In addition, at page 8 of the Office Action, the Examiner appears to conclude that claim 172 is objected to but contains allowable subject matter.

Applicant has also amended claims 50, 51, 53, 54, 153, 154, 167 and 171 in line with what Applicant believes is the substance of the Examiner's conclusion that the claims contain allowable subject matter. In several instances, however, the claims do not include all of the limitations of intervening original dependent claims. For example, amended claim 50 does not contain all of the subject matter of intermediate claims 34 and 49. Applicant submits that the claims, as amended, patentably distinguish this invention over the prior art, in all likelihood for reasons previously considered by the Examiner. Applicant, in any event, requests the reexamination and reconsideration of the claims, as amended.

## **III. Rejections under 35 U.S.C. 112, second paragraph**

The Examiner rejected claim 52 under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Examiner asserted that the claim, as drafted, did not provide a sufficient antecedent basis. Applicant appreciates the Examiner's

Careful review of the claims and has amended claim 52 to recite a proper antecedent basis for the "sulfate concentrations" limitation. Similarly, Applicant has amended claims 151, 152, 156, 157, and 168. Accordingly, Applicant respectfully submits that these claims comply with the second paragraph of section 112.

#### **IV. 35 U.S.C. §§ 102 and 103**

Applicant has amended claims 34 and 150 to expressly include a media comprising a sufficient amount sulfur to sustain the anaerobic bacteria within the denitrification system during periods of time when the water to be treated contains little or no nitrates. As discussed in the specification, the anaerobic bacteria generally survive by reacting with nitrites and ammonia in the water. If the water were to contain reduced amounts of these components, the bacteria could perish, and would then need to be replaced. To prevent this, the disclosed invention uses sufficient sulfur to sustain the anaerobic bacteria for extended periods of time when the water to be treated contains a reduced amount of nitrates and/or ammonia. Since the anaerobic bacteria can feed on the sulfur in the absence of nitrites or ammonia, fluctuations in the amount of nitrites or ammonia in the water will not affect the health of the bacteria, or the effectiveness of the denitrification system. Applicant submits that the inventions set forth in independent claims 34 and 150 are not disclosed by or obvious in view of the prior art of record. Dependent claims 35-37, 41, 43-45, 49, 55, 151, 152, and 164 are patentable for these reasons, and in addition contain additional limitations that further distinguish Applicant's invention over the prior art.

In order for prior art to anticipate a claim under the provisions of §102, the prior art reference must teach every aspect of the claimed invention. If a reference does not expressly teach every element of the claim, the limitation may be inherently anticipated by the prior art. See M.P.E.P. §2112. To establish inherency, “the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.’” *In re Robertson*, 169 F. 3d 743, 745 (Fed. Cir. 1999); accord M.P.E.P. § 2112. Similarly, in order to establish a *prima facie* case of obviousness under §103, (1) there must be some suggestion or motivation to modify prior art references or to combine the reference teachings; (2) there must be a reasonable expectation of success for the modification; and (3) the prior art must suggest or teach all the claim limitations. M.P.E.P. § 2143. With respect to the present application, the prior art does not suggest or teach all the claim limitations, and therefore is neither anticipated by, nor obvious in light of the prior art.

For example, U.S. Patent No. 6,730,226, issued to Takada on May 4, 2004 (hereafter referred to as “Takada”) discloses a water purifying method and apparatus including denitrification by anaerobic bacteria. Takada, however, does not disclose or suggest the use of any media comprising sulfur, and therefore does not disclose each and every limitation of the presently amended claims. Similarly, U.S. Patent No. 4,620,929, issued to Hoffmann on November 4, 1986 (hereinafter referred to as “Hoffmann”), does not disclose the use of any sulfur media, and therefore does not disclose each and every limitation of the present claims. Instead, the Hoffmann process

for the removal of protein and degradation products from water discloses only a filter material that is an inert carrier, such as a plastics material, containing a slowly released nutrient such as lactose, dextrose, and/or a phthalic acid ester. Hoffmann does not disclose or even suggest the use of a media containing sulfur.

In rejecting the original claims, not now pending, the Examiner expressed the view that U.S. Patent No. 5,670,046, issued to Kimmel on September 23, 1997 (hereafter referred to as "Kimmel") discloses a "second apparatus (30) made of opaque material (col.5, lines 5-7 and 27-30) containing anaerobic bacteria on crushed lava (34), a substance containing sulfur . . . ." Office Action mailed March 4, 2005, at pages 4-5. As recognized by the Examiner, the only connection between Kimmel and sulfur is the disclosure of lava. Kimmel does not disclose that lava does or does not contain any sulfur, and there is no suggestion or teaching that Kimmel's media contains sufficient sulfur to meet or suggest Applicant's claimed inventions of claims 34 and 150. Rather, Kimmel discloses lava to be "an inert substrate which retains an aerobic microorganism." Kimmel, col. 4, l. 36-37. According to Kimmel, lava "has a large surface area to volume ratio to provide good water contact and support for bacterial growth." *Id.* at col. 4, l. 61-63. These physical characteristics make it the preferred "inert substrate" used to "retain[ ] an aerobic microorganism." *Id.* at col. 4, l. 36-37. Because the lava is inert, i.e., only used to "retain" the aerobic microorganisms and not promote growth or health of the bacteria, Kimmel discloses that the aerobic bacteria may be "biologically seeded with a mixture of manure and water." *Id.* at col. 4, l. 67 – col. 5, l. 1. Because Kimmel suggests feeding the bacteria with a mixture of manure

and water, Applicant submits that Kimmel recognized that lava and its components are not sufficient to promote the growth and health of bacteria. Applicant therefore submits that Kimmel does not disclose or suggest Applicant's claimed invention.

**V. Conclusion**

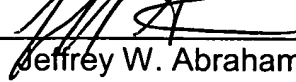
In view of the foregoing amendments and remarks, Applicant respectfully requests the reexamination and reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

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Dated:

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